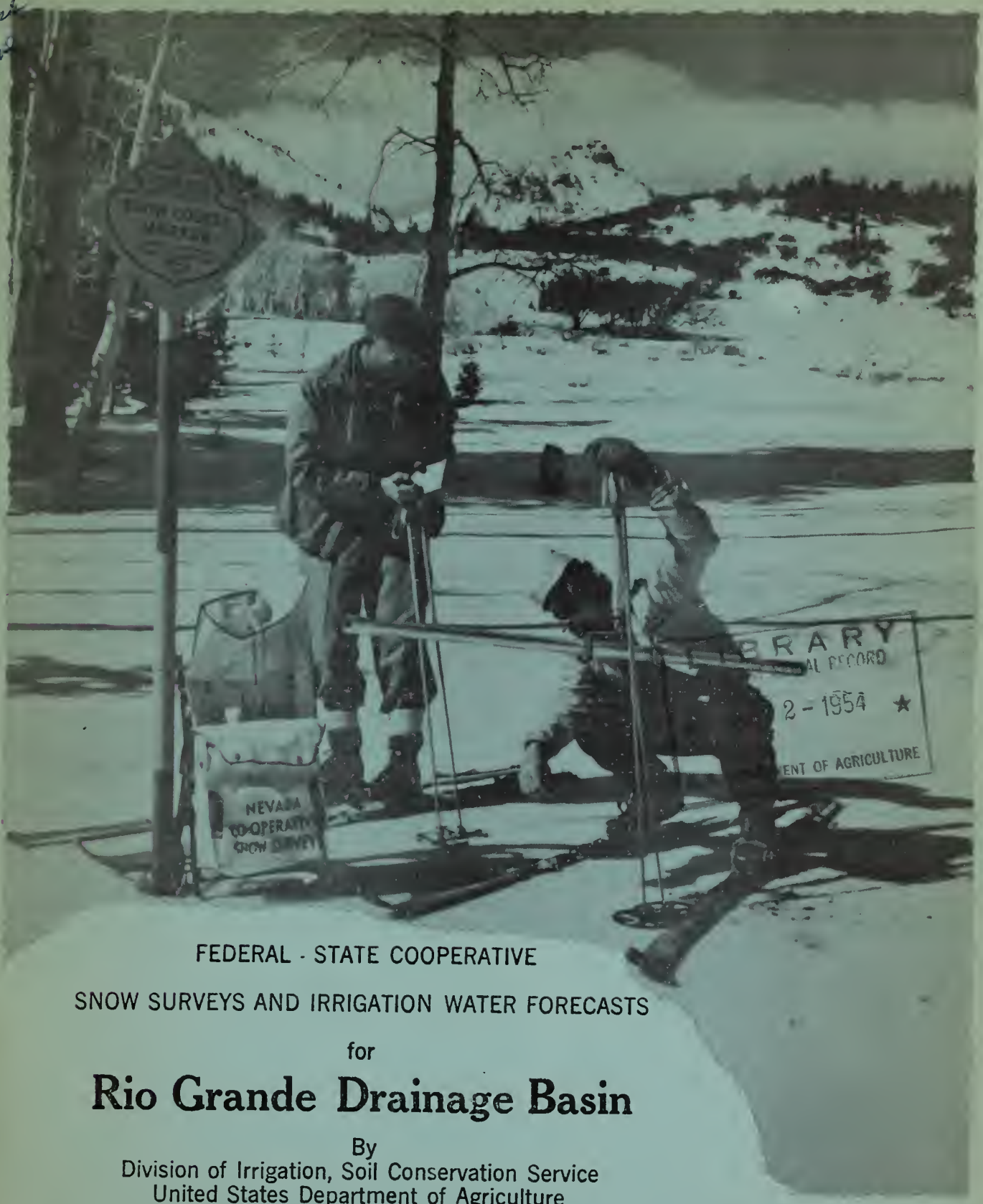


FEDERAL - STATE COOPERATIVE

SNOW SURVEYS AND IRRIGATION WATER FORECASTS

for

Rio Grande Drainage Basin

By
Division of Irrigation, Soil Conservation Service
United States Department of Agriculture
and
Colorado Agricultural Experiment Station

Data included in this report were obtained by the agencies named above in cooperation with the U. S. Forest Service, National Park Service, State Engineers of Colorado, Wyoming and New Mexico and other Federal, State and local organizations.

As of

APR. 1, 1952

FEDERAL-STATE COOPERATIVE
SNOW SURVEYS AND IRRIGATION
WATER SUPPLY FORECASTS

FOR

RIO GRANDE BASIN

April 1, 1952

Report Prepared

by

Homer J. Stockwell, Irrigation Engineer

Division of Irrigation
Soil Conservation Service
Colorado Experiment Station
Fort Collins, Colorado

General Series Paper No. 515
Colorado Agricultural Experiment Station

WATER SUPPLY OUTLOOK
RIO GRANDE AND CANADIAN DRAINAGE BASINS
April 1, 1952

The snow-melt season runoff of the Rio Grande and its tributaries in San Luis Valley will be very high. Similar runoff may be expected on the Rio Chama above El Vado Reservoir. On other New Mexico tributaries stream flow will range from well above normal in the extreme north to just below normal near Taos and Santa Fe. Soil moisture conditions in irrigated areas along the Rio Grande are described as fair to poor. Current flow of the Rio Grande is reported as slightly above normal.

RIO GRANDE

Record high snow water content measurements were obtained on practically all of the snow courses on the Colorado portion of the Rio Grande drainage on April 1, 1952. The increase for the month of March was above average for the extreme high elevation courses such as Wolf Creek Pass. At elevations of 9,000 to 9,500 feet the snow water content was about the same as for March 1. There was considerable evidence of melting which has been cutting down the extreme soil moisture deficiency of the mountain soils. The snow melt season discharge of the Rio Grande and particularly the Conejos and Alamosa Rivers will probably equal or exceed any seasonal record for total flow. A similar condition may be expected on the Culebra River. Soil moisture conditions in San Luis Valley are described as fair to good.

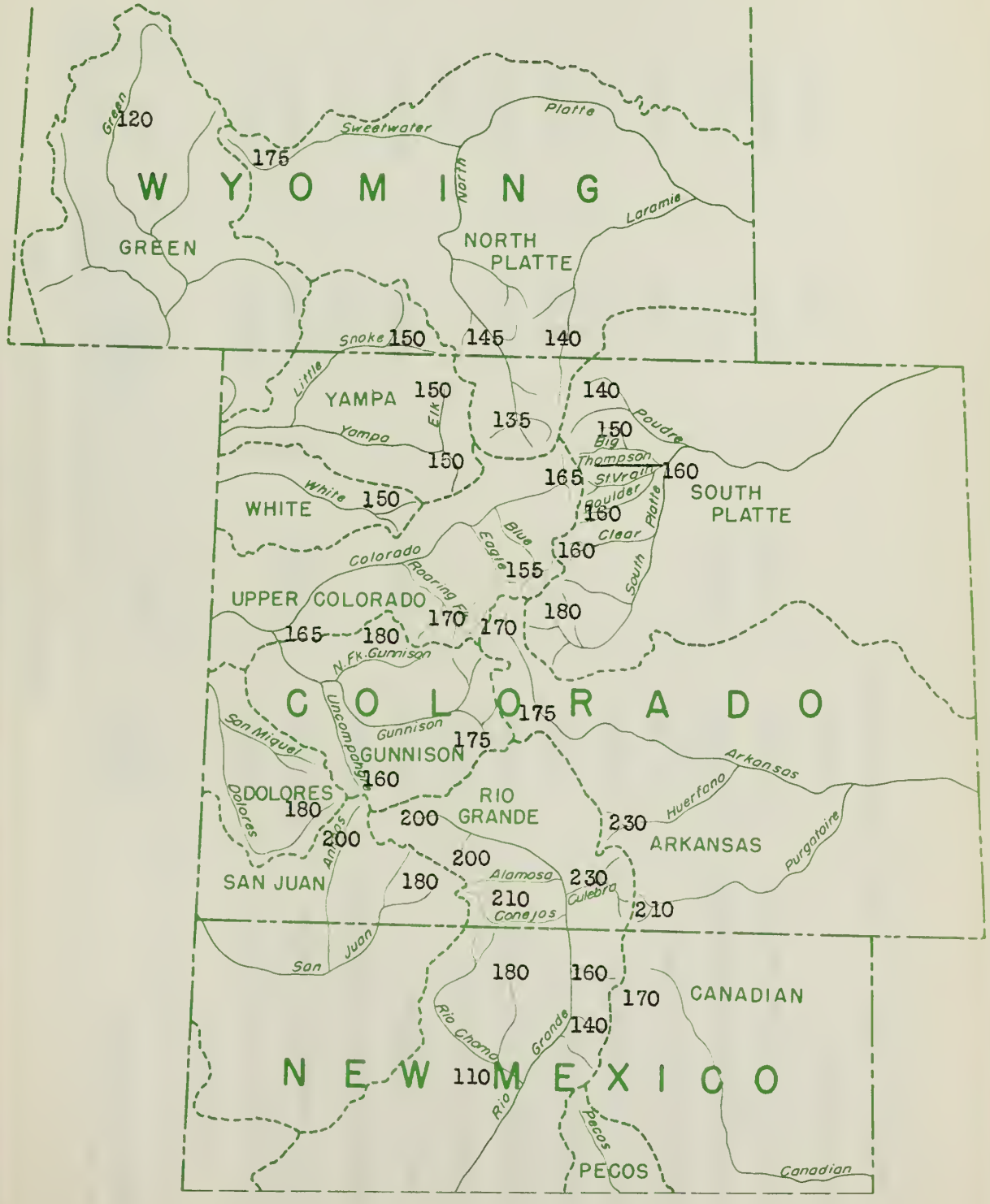
In northern New Mexico the snow water increase during March was less than normal. There was some loss of water on most courses. This loss during March occurs in many years and might be considered as near normal. Snow-melt season runoff of the Rio Chama and other streams originating in the same area will be much above average. From the Sangre de Cristo range, well above normal summer flows should occur on Costilla Creek and Red River. Normal to less than normal flow may be expected from the southern tributaries between Taos and Santa Fe. Precipitation in the Middle Rio Grande Valley has been deficient and soil moisture conditions are described as very poor.

For the lower Rio Grande Valley there is less than 100,000 acre-feet stored in Elephant Butte. This is inadequate for irrigation needs before the usual snow melt season. Soil moisture conditions in the irrigated areas are poor.

Snow-melt runoff on the Pecos and Canadian watersheds will be limited except for the Eagles Nest area. An improved irrigation water supply may be expected on Canadian River tributaries.

WATER CONTENT OF SNOW ON THE WATERSHEDS OF PLATTE, ARKANSAS, UPPER COLORADO AND RIO GRANDE BASINS BASED ON SNOW SURVEYS MADE APPROXIMATELY FIRST DAY OF MONTH

In Percent of Normal
April 1, 1952



RIO GRANDE DRAINAGE BASINS

STREAM FLOW FORECASTS, April 1, 1952

BASIN AND STREAM	April-Sept., Incl., Streamflow, Acre Feet				
	Forecast 1952	Measured Runoff 1951	1950	1949	10-year avg. 1941-1950
RIO GRANDE					
South Fork at South Fork	260,000		100,000	197,000	146,000
Rio Grande at Del Norte	1,050,000	252,000	397,000	832,000	620,000
Alamosa above Terrace Res.	150,000		56,000	105,000	82,000
Conejos at Mogote	450,000	107,000	148,000	268,000	226,000
Culebra at San Luis	80,000			35,000	37,000
Rio Chama at Park View	375,000		154,000	320,000	232,000
Costilla at Costilla	55,000	15,000	15,000	33,000	38,000
Toas at Los Cordovas	35,000		6,200	28,000	43,000
Embudo Creek at Dixon	55,000		3,000	53,000	60,000
Rio Grande at Otowi Bridge	1,800,000*	201,000	267,000	962,000	903,000
Rio Grande at San Marcial	1,500,000	23,000	55,000	852,000	707,000
Pecos at Pecos	60,000		13,000	79,000	69,000

*Including change in storage in El Vado Res.

SNOW SURVEYS AND IRRIGATION WATER FORECASTS
RIO GRANDE BASIN

STATUS OF RESERVOIR STORAGE, April , 1952

STREAM	RESERVOIR	USABLE CAPACITY 1000 A.F.	1,000 A.F. Storage, April 1				
			1952	1951	1950	1949	10-yr.Avg. 1942-1951
RIO GRANDE	Rio Grande	45.0	6.8	5.1	30.6	19.5	18.6
	Santa Maria	45.0	2.7	2.9	22.9	15.8	11.8
	Sanchez	103.0	5.4	4.5	113.0	6.2	14.3
	Terrace	17.7	2.3	1.8	4.4	2.2	3.7
	Continental	26.7	5.0	5.0	19.0	6.0	10.1
	Platoro	60.0					
	Elephant Butte	2273.7	19.1	252.7	656.1	530.0	929.2
	Caballo	356.0	78.7	152.3	221.3	158.9	233.2
CHAMA RIVER	El Vado	226.0	0.0	5.1	22.0	19.0	48.3
CANADIAN RIVER	Conchas	600.0	207.5	281.3	308.4	306.5	323.4
PECOS RIVER	Alamogordo	148.0	31.0	81.0	102.7	32.7	61.8
	McMillan-Avalon	45.0	3.0	10.9	14.0	6.0	14.2

*Some for shorter periods

SNOW SURVEYS AND IRRIGATION WATER FORECASTS
for
RIO GRANDE BASIN
April 1, 1952

SUMMARY OF APRIL 1 SNOW SURVEYS AND COMPARISON OF DATA WITH THAT OF PREVIOUS YEARS BY WATERSHEDS

WATERSHEDS	Snow Depth 1952 Inches	Snow Water Content in Inches				No. of courses in Avg.	Snow Density 1952 Percent	1952 Water Content in percent of	
		1952	1951	1950	15 yr.* Avg.			1951	15 yr. Avg.*
Rio Grande (Colo.)	59.2	22.0	6.9	9.4	10.6	9	38	319	208
Upper Rio Grande	71.6	26.7	8.2	13.5	13.9	3	37	325	194
Alamosa River	72.5	26.4	8.7	11.5	13.1	2	37	308	204
Conejos River	53.8	19.4	4.0	7.0	7.2	3	36	485	270
Culebra River	58.6	24.1	6.1	6.3	10.3	1	41	395	234
Rio Grande (N.M.)	32.2	11.1	2.8	3.3	7.0	10	35	398	157
Chama River	26.5	11.5	2.9	4.8	6.9	3	43	397	168
Pecos River	17.1	5.3	0.3	0.4	3.5	3	31	--	152
Canadian River	32.4	13.7	4.0	2.6	6.4	4	42	342	214

*Some for shorter periods

PRECIPITATION DATA

WATERSHED	STATE	Precipitation October 1 to March 31	Departure from normal	Precipitation March	Departure from normal
Canadian	New Mexico	7.08	-1.18	0.50	-0.32
Rio Grande	Colorado	4.76	-1.13	0.63	-0.04
Rio Grande (N)	New Mexico	10.73	-0.31	0.75	-0.51
Rio Grande (S)	New Mexico	3.82	-2.39	0.47	-0.06
Pecos	New Mexico	5.33	-3.71	0.43	-0.34

*Average of Selected High Elevation Stations

RIO GRANDE DRAINAGE SNOW SURVEYS
April 1, 1952

Drainage Basin and Snow Course	Location					Date of Survey	Snow Depth (Inches)	Snow Cover Measurements				
								Water Content (Inches)			Past Record	
	No. and State	Sec.	Twp.	Range	Elev.			1952	1951	1950	Yrs. of Rec.	Av. Water Content (Inches)
RIO GRANDE IN COLORADO												
Wolf Creek Pass	26 Colo.	4	37N	2E	10000	3/31	131.3	55.3	20.3	31.2	16	30.0
Upper Rio Grande	27 "	13	40N	4W	9350	3/31	48.5	14.7	2.8	6.2	16	7.4
Silver Lakes	47 "	15	36N	5E	9600	3/31	42.5	14.5	3.4	2.2	15	5.8
River Springs	49 "	25	33N	6E	9300	3/31	53.8	19.8	4.0	7.0	15	7.2
LaVeta Pass #2	74 "	22	28S	70W	9300	3/31	45.9	17.6	5.5	4.2	16	7.9
Summitville	76 "	30	37N	4E	11500	3/31	102.7	38.9	13.7	20.8	12	20.3
Santa Maria	80 "	8	41N	2W	9700	3/31	35.0	10.0	6.1	6.3	12	4.3
Culebra	82 "		37.2N	105.2W	10000	3/31	58.6	24.1	6.1	6.3	12	10.3
Ft. Garland	84 "	13	29N	72W	8200	3/30	14.1	3.5	0.4	0.0	12	2.6
Platoro	108 "	22	36N	4W	9950	4/4	80.7	38.3	12.9	18.4	3	19.9
West Conejos	109 "	25	35N	4E	9450	4/3	55.3	21.7	5.7	3.0	3	8.1
La Manga	110 "	24	32N	5E	10100	4/2	111.2	48.3	15.7	21.1	3	21.4
Pyramid	122 "	26	41N	5W	10300	3/28	56.8	18.4	6.4	7.6	3	10.4
Spr. Creek Pass	123 "	2	42N	3W	10900	3/29	50.3	16.2	7.0	8.2	3	11.4
Pool Table Mt.	124 "	19	41N	2E	10000	3/30	35.7	10.4	3.0	3.0	3	6.1
Lake Humphreys	125 "	32	40N	1E	9300	3/30	39.2	12.1	3.3	2.9	3	6.9
Cochetopa Pass	126 "	12	45N	3E	10000	3/31	34.2	6.1	4.7	3.0	3	5.3
Howardville	151 "	15	41N	7E	9800	4/1	66.2	20.3	9.6	--	1	--
Red Mt. Pass	153 "	13	42N	8E	11000	4/1	110.2	44.0	29.1	--	1	--
Porcupine	154 "	2	41N	3W	10400	2/29	58.8	19.8	6.9	--	1	--
Wolf Creek Summit	155 "	6	37N	2E	11000	3/31	130.7	52.1	19.0	--	1	--
		Average for drainage					59.2	22.0	6.9	9.4		10.6
UPPER RIO GRANDE												
Wolf Creek Pass	26 Colo.	4	37N	2E	10000	3/31	131.3	55.3	20.3	31.2	16	30.0
Upper Rio Grande	27 "	13	40N	4W	9350	3/31	48.5	14.7	2.8	6.2	16	7.4
Santa Maria	80 "	8	41N	2E	9700	3/31	35.0	10.0	1.6	3.1	13	4.3
		Average for drainage					71.6	26.7	8.2	13.5		13.9

RIO GRANDE DRAINAGE SNOW SURVEYS
April 1, 1952

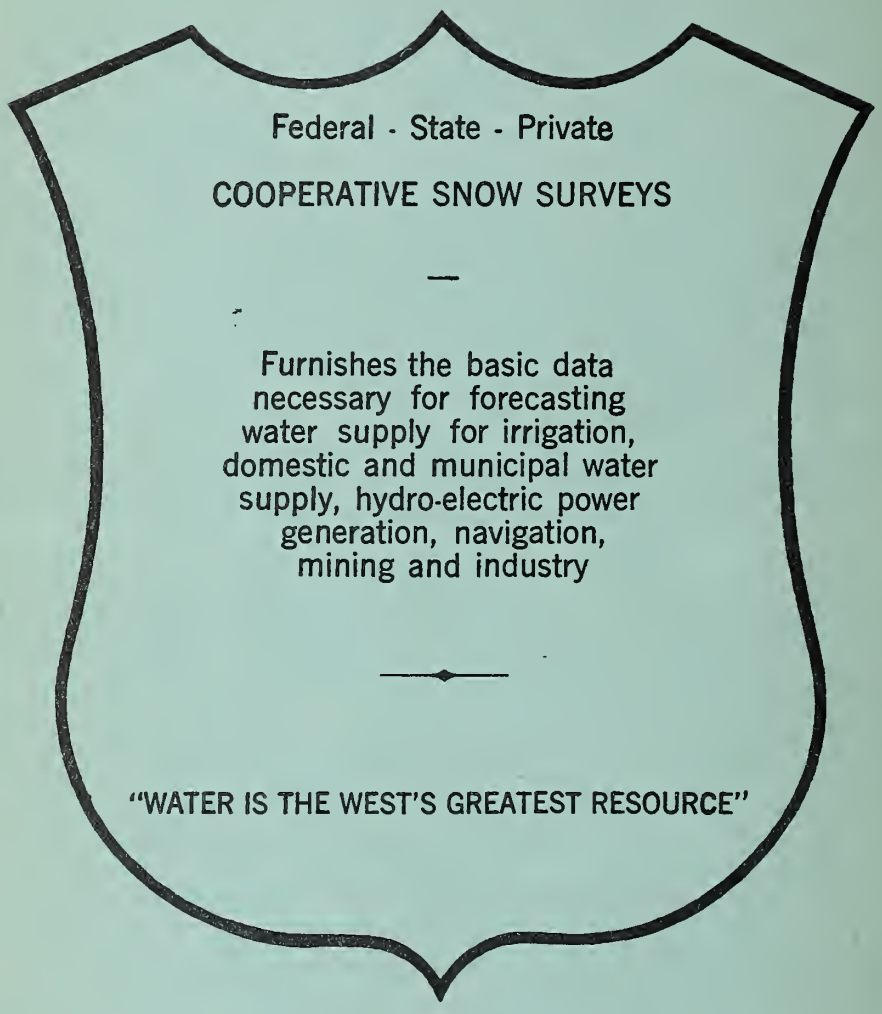
Drainage Basin and Snow Course	Location: No. and State	Sec.	Twp.	Range	Elev.	Date of Survey	Snow Depth (Inches)	Snow Cover Measurements: Water Content (Inches) 1952	1951	1950	Past Record: Yrs. of Rec.	Av. Water Content (Inches)
ALAMOSA RIVER												
Silver Lakes	47 Colo.	15	36N	5E	9000	3/31	42.4	14.0	3.4	2.2	15	5.8
Summitville	76 "	30	37N	4E	11500	3/31	102.7	38.9	13.7	20.8	12	20.3
	Average for drainage						72.5	26.4	8.7	11.5		13.1
CONEJOS RIVER												
River Springs	49 Colo.	25	33N	6E	9300	3/31	53.8	19.4	4.0	7.0	15	7.2
Cumbres Pass #2	77 "	17	32N	5E	10000				19.5	20.1	16	24.4
Platoro	108 "	22	36N	4W	9950				12.9	18.4	3	19.9
West Conejos	109 "	25	35N	4E	9450				5.4	3.0	3	8.1
La Manga	110 "	24	32N	5E	10100	4/2	111.2	48.3	15.7	21.1	3	21.4
	Average for drainage						53.8	19.4	4.0	7.0		7.2
CULEBRA RIVER												
Culebra	82 Colo.		37.2N	105.2W	10000	3/31	58.6	24.1	6.1	6.3	12	10.3
	RIO GRANDE IN NEW MEXICO											
CHAMA RIVER												
Cumbres Pass #2	77 Colo.	17	32N	5E	10000				19.5	20.1	16	24.4
Pay Role	15 N.M.	16	28N	7E	9700	3/28	44.0	16.5	3.4	7.1	12	9.2
Chama Divide	17 "		36.9N	106.7W	7750	3/31	0.0	0.0	0.0	0.0	12	2.9
Chamita	18 "		36.9N	106.7W	8500	3/31	41.4	18.0	4.2	7.3	2	8.7
Bateman	29 "	5	26N	6E	9300	3/31	52.2	19.0	8.9	12.8	2	10.9
	Average for drainage						26.5	11.5	2.9	4.8		6.9
PECOS RIVER												
Aspen Grove*	4 N.M.	8	28N	15E	9500	4/1	13.4	4.3	0.0	0.6	15	3.2
Panchuela	20 "	25	24N	16E	9200	3/27	13.1	3.9	0.6	0.0	15	2.0
Big Tesuque*	21 "	23	22N	13E	9000	4/1	24.9	7.7	0.3	0.6	10	5.2
Gallinas	25 "	22	22N	13E	10100	3/26	10.0	2.4	1.0	0.0	4	0.1
	Average for Drainage						17.1	5.3	0.3	0.4		3.5

*On adjacent drainage

RIO GRANDE DRAINAGE SNOW SURVEYS
April 1, 1952

Drainage Basin and Snow Course	Location					Snow Cover Measurements						
	No. and State	Sec.	Twp.	Range	Elev.	Date of Survey	Snow Depth (Inches)	Water Content (Inches) 1952	1951	1950	Past Record Yrs. of Record	Past Record Av. Water Content (Inches)
RIO GRANDE IN NEW MEXICO												
Red River	1 N.M.	29	28N	15E	9500	4/1	44.2	14.0	2.4	3.5	15	7.9
Taos Canyon	2 "	10	25N	15E	9000	4/1	25.9	9.0	2.5	2.8	13	6.8
Aspen Grove	4 "	12	18N	10E	9100	4/1	13.4	4.3	0.0	0.6	15	3.2
Tres Ritos	12 "	23	22N	13E	9000	4/1	29.3	8.4	2.7	0.2	14	5.0
Pay Role	15 "	16	28N	7E	9700	3/31	44.0	16.5	3.4	7.1	12	9.2
Chama Divide	17 "		36.9N	106.7W	7750	3/31	0.0	0.0	0.0	0.0	12	2.9
Chamita	18 "		36.9N	106.7W	8500	3/31	41.4	18.0	4.2	7.3	10	8.7
Cordova	19 "	22	22N	13E	10100	3/31	53.4	18.3	9.2	7.8	10	12.2
Panchuela #2	20 "	27	19N	12E	8300	3/27	13.1	3.9	0.6	0.0	15	2.0
Big Tesuque	21 "	17	18N	11E	10000	4/1	24.9	7.7	0.3	0.6	10	5.2
Elk Cabin	24 "	8	18N	11E	8250	4/1	11.5	3.2	0.0	0.0	4	0.7
Rio En Medio	26 "	8	18N	11E	10400	4/1	34.6	9.2	2.6	2.2	2	1.6
Quemazon	28 N.M.	34	20N	5E	9500	3/28	41.8	10.0	4.3	3.5	2	
Bateman	29 "	5	26N	6E	9300	3/31	52.2	19.0	8.9	12.8	2	10.9
Fenton Hill	31 "	18	19N	3W	8900	3/29	26.3	8.0	--	--	-	--
		Average for drainage					32.2	11.1	2.8	3.3		7.0
CANADIAN RIVER												
Hematite Park	9 N.M.	8	28N	15E	9500	3/31	30.3	8.2	2.5	0.0	15	5.1
Ocate Mesa	10 "	25	24N	16E	9200	3/26	16.6	6.1	1.5	0.3	14	3.5
Tres Ritos*	12 "	23	22N	13E	9000	4/1	29.3	8.4	2.7	0.2	14	5.0
Cordova*	19 "	22	22N	13E	10100	3/31	53.4	18.3	9.2	7.8	10	12.2
		Average for drainage					32.4	13.7	4.0	2.6		6.4

*On adjacent drainage


Federal - State - Private
COOPERATIVE SNOW SURVEYS
Furnishes the basic data necessary for forecasting water supply for irrigation, domestic and municipal water supply, hydro-electric power generation, navigation, mining and industry
"WATER IS THE WEST'S GREATEST RESOURCE"